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## EUROPEAN PATENT APPLICATION

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54 A razor.

57 A razor including a handle (2) and a blade unit (4) mounted on the handle (2) for pivotal movement thereon, the blade unit (4) comprising a housing (6) having a blade (8) therein, a pair of projections (14) extending from an underside of the housing (6) toward the handle (2), and a leaf spring (18) extending from the handle (2) toward the blade unit (4), the leaf spring (18) being fixed at a first end (20) to the handle, a second end (22) of the leaf spring (18) being disposed between the projections (14) and in contact therewith, the spring (18) being twisted about its lengthwise axis and retained in a twisted condition by the projections (14), the leaf spring (18) thereby exercising a force on each of the projections (14) to cause the blade unit to be biased toward a neutral position on the handle (2).

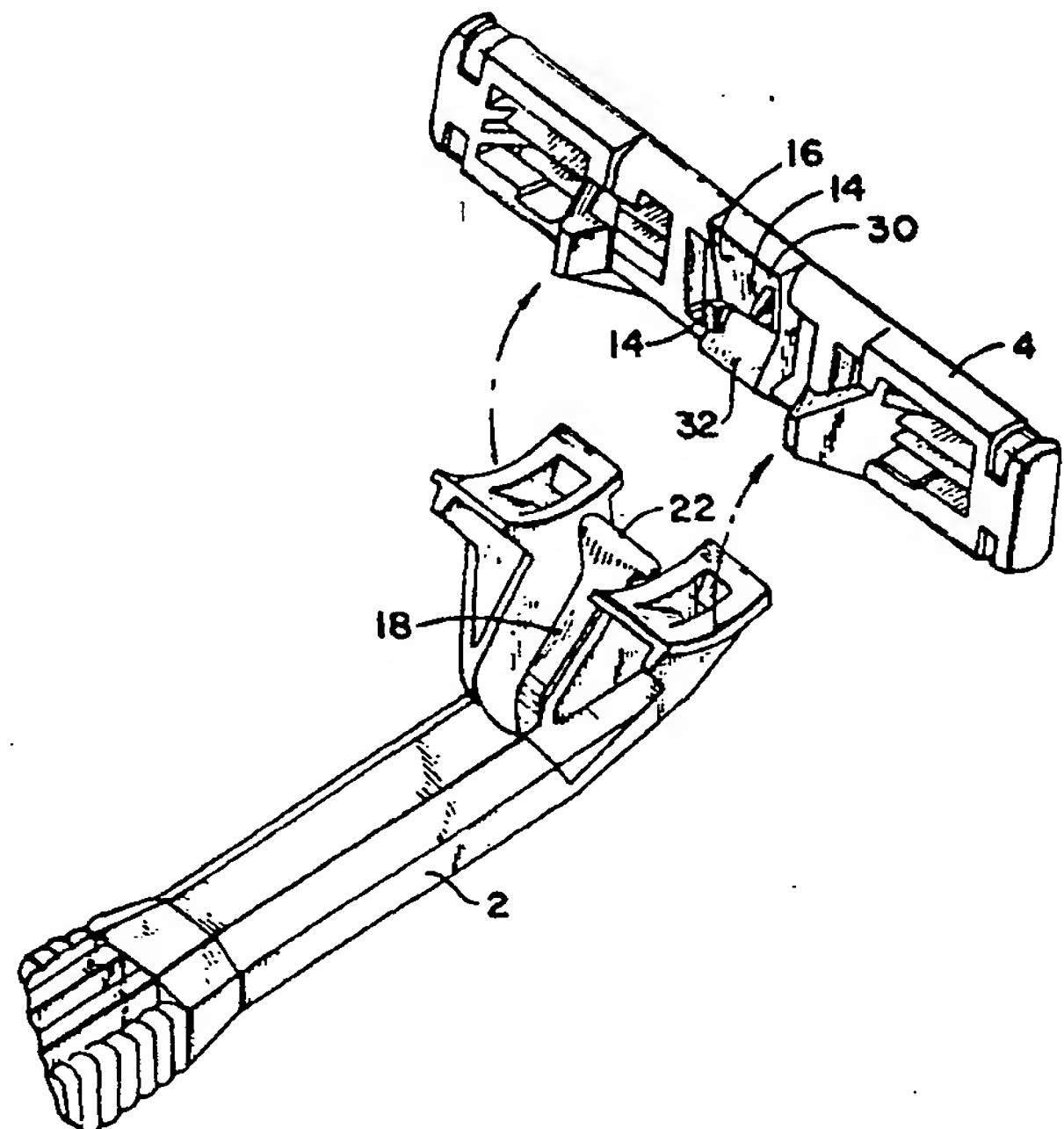


Fig. 1

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## A RAZOR

The invention relates to wet shaving razors, and more particularly to a razor of the type in which the head portion is pivotally moveable during a shaving operation.

Razors of the type disclosed in U.S. Patent No. 4,026,016, are now well known in the art. They are characterized by the fact that the head portion of the razor has the facility for pivoting on the razor handle during a shaving operation, permitting the razor head to conform dynamically to a surface being shaved. The razor head of the '016 patent is urged to a neutral position on the handle by a spring-biased reciprocal follower interacting with cam surfaces on the underside of the head portion. Thus, as the head portion pivots upon the handle, it is always urged to return to its neutral position.

There is also disclosed in the U.S. Patent 4,026,016, and also in U.S. Patent No. 4,083,104, an alternative embodiment in which the handle is molded of plastic and has extending therefrom toward the head portion a pair of arms molded integrally with the handle. The two arms engage cam surfaces on the underside of the head portion to urge the head portion to a neutral position on the handle.

In U.S. Patent No. 4,094,063, there is disclosed a razor handle having a plastic leaf spring molded integrally with the handle and adapted to interact with cam surfaces on the underside of a razor head portion pivotally mounted on the handle. In this instance, the spring is in the form of an inverted "U", with the middle of the "U" engaging the cam surfaces.

In U.S. Patent No. 3,935,639, there is disclosed a razor having a leaf spring extending from a razor handle toward a pivotally mounted razor head portion. The leaf spring is anchored at one end in the handle, with its other end extending into a groove on the underside of the head. Pivoting of the head portion causes the leaf spring to flex and exercise a force on the head portion, biasing the head portion back to a neutral position.

A shortcoming in the above, and similar, systems has been the "feel" of the head portion when in the neutral position. In the neutral position, the springs of the above identified prior patent exercise little or no force on the head portion, leaving the head portion with an unsupported "feel". The first embodiment of U.S. Patent 4,026,016 is somewhat better in this regard, but requires extensive mechanical structure including the reciprocal follower and the coil spring.

According to the present invention there is provided a razor including a handle and a blade

unit mounted on said handle for pivotal movement thereon, said blade unit including a housing having blade means therein, a pair of non-aligned projections extending from an underside of said housing toward said handle and a leaf spring extending from said handle toward said blade unit, said leaf spring being fixed at a first end to said handle, a second end of said leaf spring exceeding in width the distance between said non-aligned projections, said spring being in a twisted condition by the free second end of the leaf spring engaging said non-aligned projections, said spring having a bias toward an un-twisted condition and thereby exercising a force on each of said projections to cause said blade unit to be biased toward a neutral position on said handle. The invention will now be more particularly described with reference to the accompanying drawings, in which the particular device embodying the invention is shown by way of illustration only and not as a limitation of the invention. The principles and features of this invention may be employed in various and numerous embodiments without departing from the scope of the invention.

In the drawings:

FIG. 1 is a front perspective view of one form of razor illustrative of an embodiment of the invention, showing the blade unit and a portion of the handle;

FIG. 2 is a sectional view of the razor of FIG. 1;

FIG. 3 is a bottom view of a central portion of the blade unit showing the projections extending therefrom; and

FIG. 4 is similar to FIG. 3, but shows the spring member in engagement with the projections, the spring finger being twisted about its lengthwise axis.

Referring to the drawings, and particularly FIGS. 1 and 2, it will be seen that the illustrative razor includes a handle 2 and a blade unit 4 mounted on the handle for pivotal movement, as is fully described in U.S. Patent No. 4,488,357.

The blade unit includes a housing 6 having blade means 8 disposed therein, as well as a guard member 10, all as described in U.S. Patent 4,488,357. The blade unit may be provided with a strip of shaving aid material 12, attached to the cartridge as shown in FIG 2, and as is fully described in U.S. Patent No. 4,586,255.

Referring to FIGS. 2, 3 and 4, it will be seen that the blade unit is provided with a pair of non-aligned projections 14 extending from an undersurface 16 of the cartridge toward the handle. The

handle 2 is provided with an elongated leaf spring 18 extending from the handle toward the blade unit 4. The leaf spring 18 is fixed at a first end thereof 20 to the handle, preferably being molded integrally therewith. A second end 22 of the leaf spring is disposed between the projections 14, as is shown in FIGS. 2 and 4, and is in contact with the projections. This second end 22 of the leaf spring 18 is enlarged and is wider than that space between said non-aligned projections 14.

The spring 18 is twisted about its lengthwise axis and is retained in its twisted condition by the projections 14 (FIG. 4). The leaf spring 18 accordingly exercises a force against the projections to cause the blade unit, during a shaving operation, to be biased toward a neutral position. Even in the neutral position, the twisted leaf spring exercises an equal force upon the two projections, imparting to the blade unit the "feel" of being at all times under a bias. As noted above, the prior art razors having integrally-molded springs for centering shaving units tend to leave the blade unit in the neutral position with a detectable "dead" feel. In the prior art molded razors, the blade unit picks up a detectable bias only after substantial pivoting movement. The leaf spring 18 of the present invention imparts a bias to the blade unit even in the absolute neutral position.

In operation, the blade unit responds immediately to the slightest off-set from the neutral position, and in the neutral position has a more reassuring feel to the operator.

The blade unit 4 may, if desired, be provided with cam surfaces 30, 32 adapted for engagement with the type of cam follower disclosed in U.S. Patents 4,026,016; 4,094,063; 4,488,357. Thus, the blade unit may be used with any of several types of centering spring means.

## Claims

1. A razor including a handle (2) and a blade unit (4) mounted on said handle for pivotal movement thereon, said blade unit including a housing (6) having blade means (8) therein, characterized in that a pair of non-aligned projections (14) extend from an underside of said housing (6) toward said handle (2) and a leaf spring (18) extends from said handle toward said blade unit, in that a first end (20) of said leaf spring (18) is fixed to said handle (2) and a second end (22) of said leaf spring exceeds in width the distance between said non-aligned projections (14), and in that said spring is maintained in a twisted condition by the free second end of said spring engaging said non-aligned projections, said spring having a bias toward an untwisted condition and thereby exercising a force on

each of said projections to cause said blade unit (4) to be biased toward a neutral position on said handle (2).

2. A razor according to claim 1, characterized in that the handle (2) is of molded plastics and its leaf spring (18) is molded integrally with said handle.

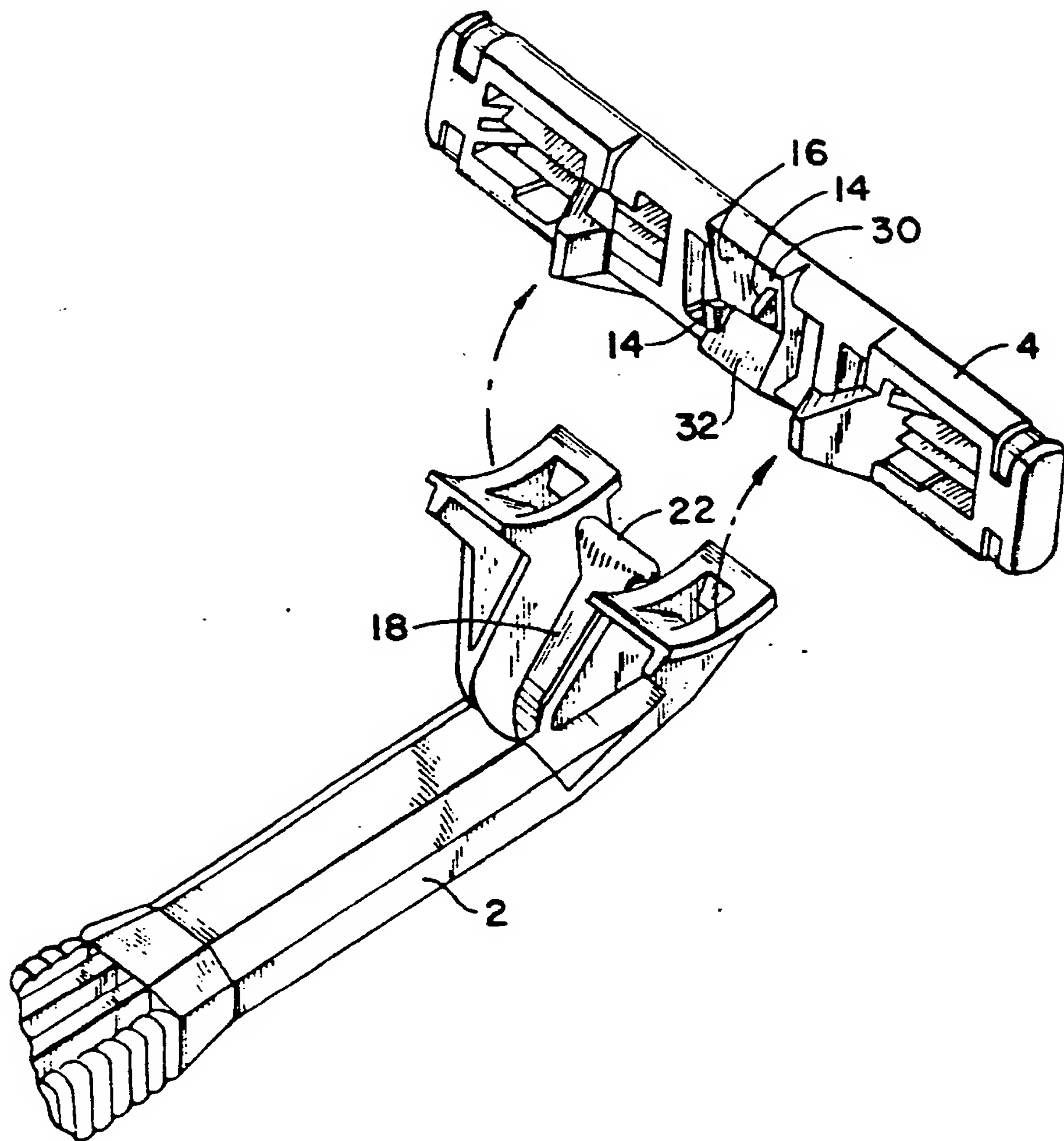


Fig. 1

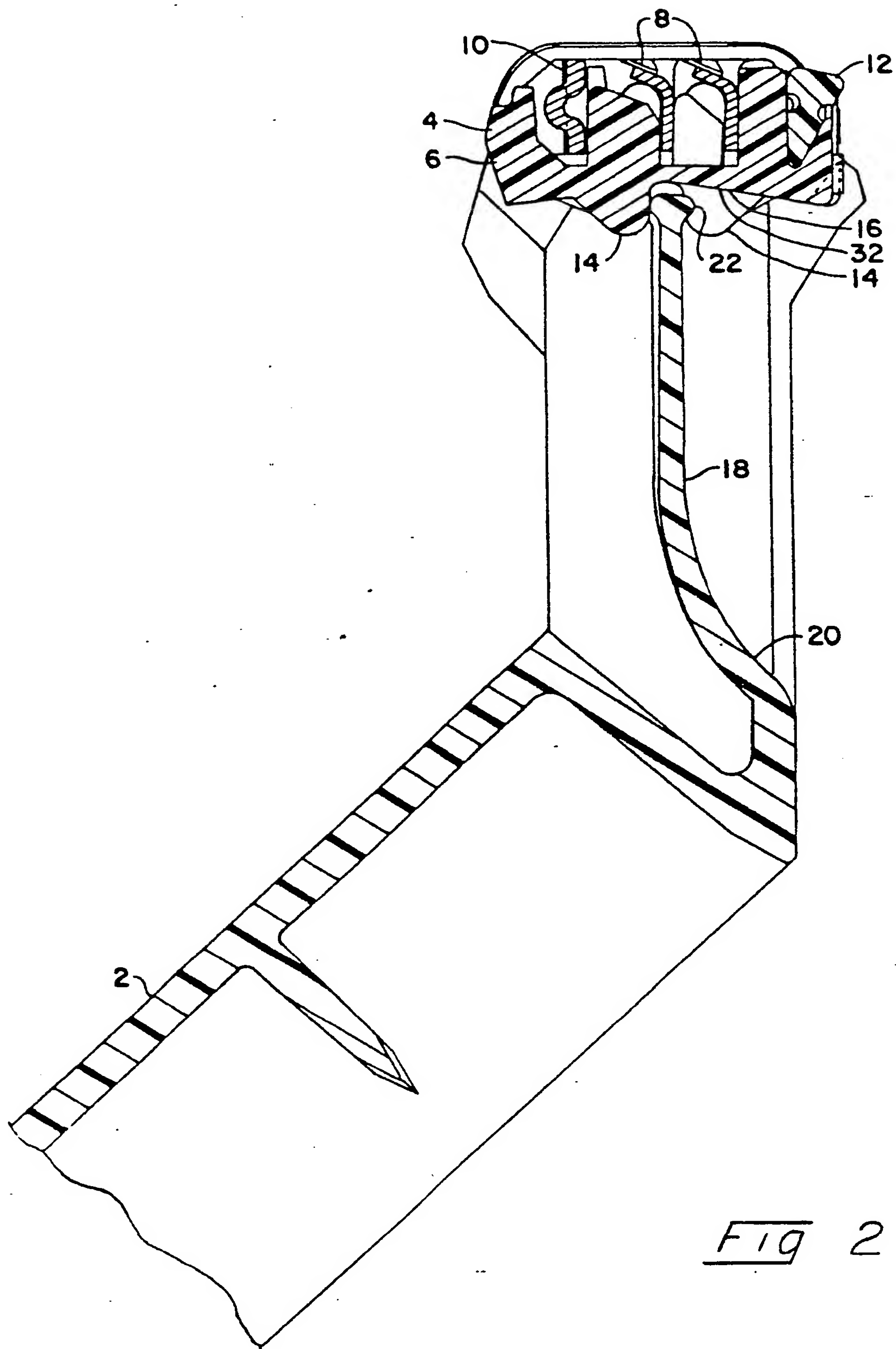


Fig 2

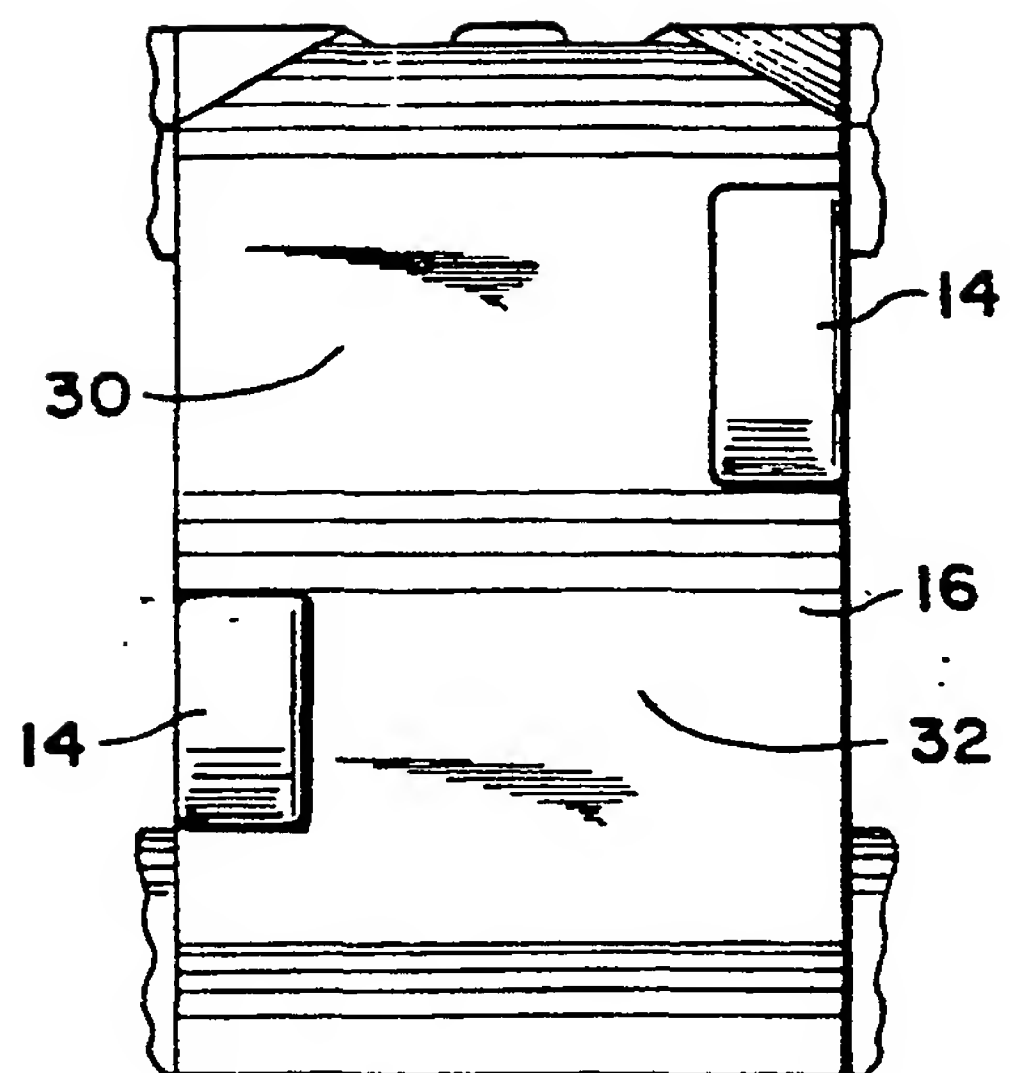


Fig. 3

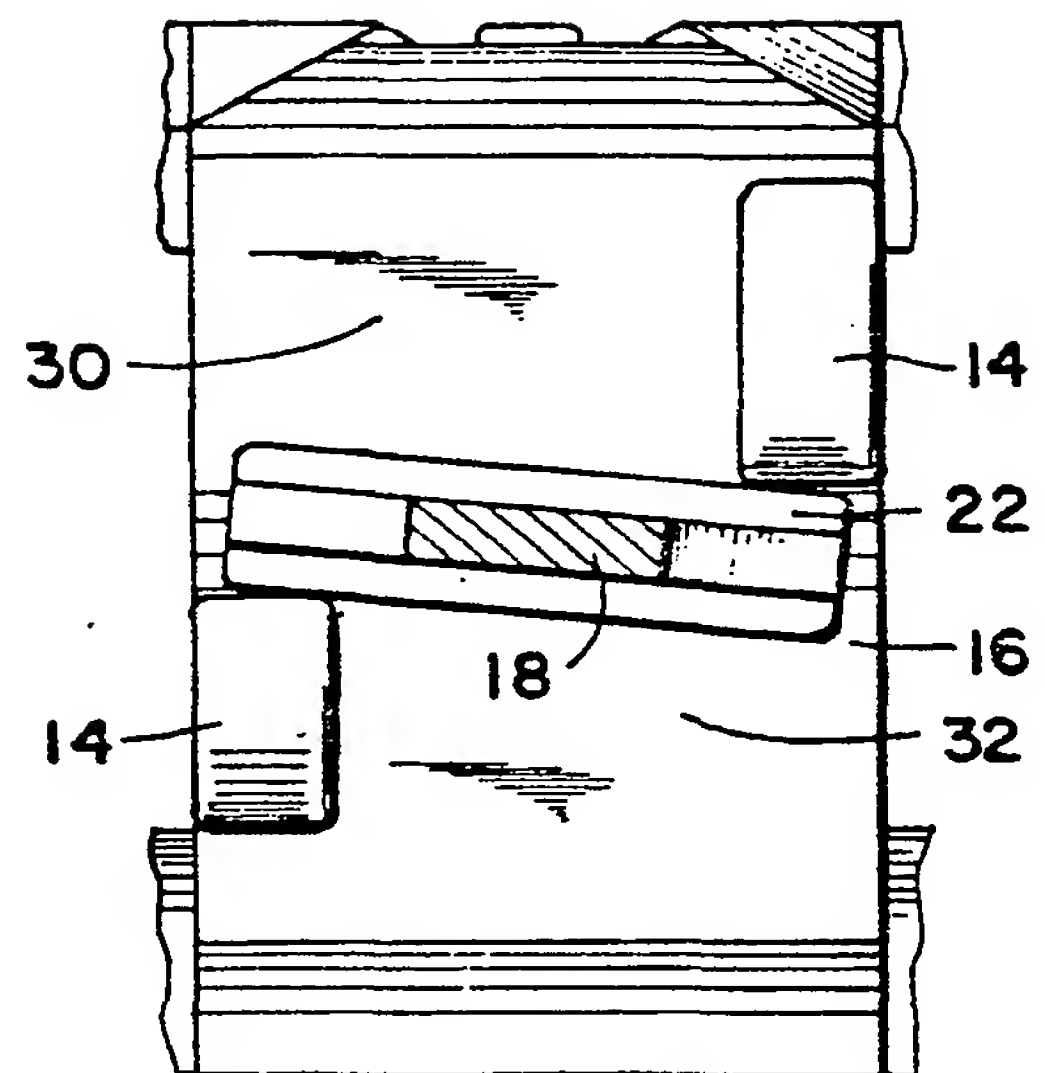


Fig. 4



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# EUROPEAN SEARCH REPORT

Application Number

EP 88 11 8845

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl. 4)
A	GB-A-2 066 133 (WARNER-LAMBERT) * Page 1, line 114 - page 2, line 86; figures 1-3 * ---	1,2	B 26 B 21/22 B 26 B 21/52
A	EP-A-0 203 527 (S. MERKUR) * Page 3; figure 1 * ---	1,2	
A	DE-A-3 141 361 (KAI CUTLERY CENTER CO. LTD) * Pages 4,5; figures 1,2 * ---	1	
A	GB-A-2 116 470 (THE GILLETTE CO.) ---		
A	US-A-1 593 459 (D.H. MacFALLS) -----		
			TECHNICAL FIELDS SEARCHED (Int. Cl.4)
			B 26 B
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 23-02-1989	Examiner WOHLRAPP R.G.
<div>CATEGORY OF CITED DOCUMENTS</div> <div>X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document</div> <div>T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons ..... &amp; : member of the same patent family, corresponding document</div>			

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